WHAT IS CLAIMED IS:

1. A device for placing a target vessel in fluid communication with a source of blood, the device comprising:

a conduit having a length and a lumen adapted to deliver blood from a blood source to a lumen of a target vessel;

a first securing component configured to engage an inner surface of a wall of the target vessel and a second securing component configured to engage an outer surface of the target vessel wall, wherein the first and second securing components are configured to at least partially capture the target vessel wall adjacent an incision in the target vessel wall; and

wherein the conduit extends away from the second securing component without passing through the incision in target vessel wall.

2. The device of claim 1, wherein at least one of the first and second securing components has a non-circular periphery.

3. The device of claim 2, wherein each of the first and second securing components has a non-circular periphery and a radius of curvature selected to substantially match the profile of the target vessel wall.

4. The device of claim 1, wherein the conduit is a separate member coupled to the second securing component to form a continuous luminal surface substantially free of discontinuities.

5. The device of claim 4, wherein the conduit comprises synthetic vascular graft material.

6. The device of claim 1, wherein the conduit extends away from the second securing component to form a substantially 90° angle and a generally T-shaped configuration, and the first securing component has a complimentary T-shaped configuration adapted to be received in the junction of the second securing component.

7. The device of claim 1, further comprising a reinforcing member that supports at least a portion of the length of the conduit.

8. The device of claim 1, further comprising a mechanism for fixing the first and second securing components in position with respect to the target vessel wall.

9. The device of claim 8, wherein the mechanism comprises mating projections and grooves carried by the first and second securing components.

10. The device of claim 1, wherein the conduit is configured to lie substantially flat along an area extending between the blood source and the target vessel.

11. The device of claim 10, wherein the conduit includes a bendable member extending over at least part of the length of the conduit to allow the conduit to be moved to and remain in a substantially flat profile.

12. The device of claim 11, wherein the bendable member has portions with different degrees of stiffness to allow selected areas of the conduit to assume more load than other areas of the conduit during use.

13. The device of claim 12, wherein the bendable member has varying thickness to provide the varying degrees of stiffness.

14. The device of claim 1, wherein one end of the conduit is coupled to the second securing component and another end of the conduit is coupled to a device for establishing fluid communication with a heart chamber containing blood.

15. The device of claim 1, wherein at least one of the securing components has a length and a width, the length being defined generally along the axis of the target vessel when the device is positioned in the target vessel, and wherein the length of the at least one securing component is greater than the width of the at least one securing component.

16. The device of claim 15, wherein the length of the at least one securing component is between 1 and 4 times greater than the width of the at least one securing component.

17. The device of claim 1, further comprising a conduit supporting device coupled to the second securing component for contacting tissue adjacent the target vessel to prevent the device from collapsing the target vessel.

18. The device of claim 1, wherein at least one of the conduit and the first and second securing components is provided with a radiopaque marker.

19. The device of claim 1, wherein the first and second securing components are configured to secure the conduit to the target vessel in a non-penetrating manner, with only a portion of the first securing component passing through the incision in the target vessel wall.

20. A device for placing a target vessel in fluid communication with a source of blood, the device comprising:

a conduit adapted to deliver blood from a blood source to a lumen of a target vessel; and

first and second securing components respectively configured to engage inner and outer surfaces of a wall of the target vessel adjacent an incision formed in the target vessel wall, wherein the first and second securing components include a tissue-capturing mechanism that at least partially captures tissue of the target vessel wall;

wherein the conduit is coupled to one of the first and second securing components and is secured to the target vessel wall by the tissue-capturing mechanism;

wherein the tissue-capturing mechanism is configured to substantially fix the relative position of the first and second securing components in the tissue-capturing position without penetrating the target vessel wall tissue other than forming the incision in the target vessel wall.

21. The device of claim 20, wherein the conduit is coupled to the first securing component, and the second securing component has an opening through which the conduit passes, and the opening seals against an exterior surface of the conduit.

22. The device of claim 20, further comprising a mechanism for maintaining the first and second securing components in the tissue-capturing position, wherein the mechanism comprises at least one length of fastening material secured to the first securing component and passing through an aperture in the second securing component, and the length of fastening material is tensioned to fix the relative positions of the first and second securing components.

23. The device of claim 22, wherein a plurality of lengths of fastening material are secured to the first securing component and a plurality of corresponding apertures are formed in the second securing component.

24. The device of claim 23, wherein the fastening material comprises lengths of suture.

25. The device of claim 20, wherein the conduit is formed to assume a low profile with respect to the target vessel and the blood source in use.

26. The device of claim 20, wherein the conduit is reinforced by a coil to prevent the conduit from collapsing during use.

27. The device of claim 26, wherein the coil is a separate member joined to one of the first and second securing components.

28. The device of claim 27, wherein an end of the coil is threaded through openings formed in the first securing component and is fixed thereto.

29. The device of claim 20, wherein at least one of the first and second securing components is generally rectangular with straight sides and at least one rounded end.

30. The device of claim 20, wherein the first securing component comprises a base member with a coating formed of a material selected from the group consisting of silicone, expanded polytetrafluoroethylene, polyurethane, polyamides, polyimides, fluoroethylpolypropylene and polypropylfluorinated amines.

31. The device of claim 20, wherein the second securing component is configured to overlie an exterior surface the target vessel wall and is saddle-shaped so as to substantially surround the first securing component.

32. The device of claim 31, wherein the first securing component is configured to lie within at least part of the target vessel lumen and is saddle-shaped so as to substantially match the profile of the second securing component.

33. The device of claim 20, wherein the mechanism for maintaining the first and second securing components in a tissue-capturing position comprises locking elements that are carried by the securing component and snapped together to capture the tissue.

34. The device of claim 33, wherein the locking elements are configured to be snapped together in different positions to capture the tissue of various sizes of target vessel walls.

35. The device of claim 20, further comprising a piece of material disposed between the target vessel wall and at least one of the first and second securing components for promoting tissue ingrowth and fixing the position of the one securing component relative to the target vessel wall.

36. The device of claim 35, wherein the piece of material comprises a Dacron® member at least partially surrounding the incision formed in the target vessel wall.

37. A device for placing a target vessel in fluid communication with a source of blood, the device comprising:

first and second securing components, wherein one of the first and second securing components is sized and configured to engage an interior surface of a wall of the target vessel, while the other securing component is sized and configured to engage an exterior surface of the target vessel wall to compress the tissue of the target vessel wall between the first and second securing components; and

a conduit having a length and a lumen adapted to deliver blood from a blood source to the target vessel;

wherein the conduit is coupled to at least one of the first and second securing components by a flexible connection that allows the conduit to be moved with respect to the one securing component.

38. The device of claim 37, wherein the connection allows the conduit to be moved at least between about 0° to 180° with respect to the one securing component without occluding the lumen of the conduit, thereby allowing the conduit to be moved adjacent tissue surrounding the target vessel without occluding the lumen of the conduit.

39. A device for placing a target vessel in fluid communication with a source of blood, the device comprising:

first and second securing components respectively configured to engage at least portions of interior and exterior surfaces of a wall of the target vessel; and

a conduit having a length and a lumen adapted to deliver blood from a blood source to a target vessel, the conduit being coupled to at least one of the first and second securing components;

wherein at least part of the conduit is formed in a predetermined shape and assumes a desired orientation with respect to the target vessel when placed in communication with the source of blood and the target vessel.

40. The device of claim 39, wherein the source of blood is a heart chamber and the target vessel is a coronary vessel, and the conduit assumes a low profile orientation adjacent the myocardium.

41. The device of claim 39, wherein the predetermined shape is imparted to the conduit by molding the conduit.

42. The device of claim 39, wherein less than the entire conduit is formed in the predetermined shape.

43. The device of claim 42, wherein the conduit is formed in the predetermined shape at a location that is adjacent at least one of the blood source and the target vessel when the conduit is in use.

44. A device for placing a target vessel in fluid communication with a source of blood, the device comprising:

first and second securing components, wherein the first securing component is sized and configured to engage the interior surface of a wall of the target vessel, while the second securing component is sized and configured to engage the exterior surface of the target vessel wall to capture the target vessel wall tissue between the first and second securing components; and

a conduit having a lumen and adapted to pass through an incision formed in the target vessel wall to deliver blood from a blood source to the target vessel;

wherein the conduit and one of the first and second securing components form a blood flow path defined by a continuous surface substantially free of discontinuities to promote desired fluid dynamics through the conduit.

45. The device of claim 44, wherein the conduit and the first securing component form the blood flow path, and the blood flow path is defined by a continuous surface that is completely free of discontinuities.

46. The device of claim 45, wherein the conduit and the first securing component support a continuous liner of non-thrombogenic material that defines the blood flow path.

47. In combination, a conduit for placing a target vessel in fluid communication with a source of blood and a delivery device for use in placing the conduit in a patient's body, the combination comprising:

a conduit having a length and an inner lumen adapted to deliver blood from a blood source to a target vessel, the conduit being coupled to at least one of first and second securing components;

wherein the first securing component is sized and configured to engage an interior surface of a wall of the target vessel, while the second securing component is sized and configured to engage an exterior surface of the target vessel wall to capture the target vessel wall between the first and second securing components; and

a delivery device including a working end for releasably retaining at least one of the first and second securing components.

48. The combination of claim 47, wherein the conduit comprises a graft vessel, the delivery device has a shaft sized and configured to be passed through the lumen of the conduit, and the working end includes a movable retainer controlled by an actuator.

49. The combination of claim 46, wherein the graft vessel comprises an autologous vessel coupled to a device sized and configured to be placed in fluid communication with a heart chamber containing blood, and the first and second securing components are sized and configured to engage a wall of a coronary vessel.

50. A method for securing a conduit to a target vessel of a patient's vascular system, the method comprising steps of:

(a) providing a conduit adapted to be placed in fluid communication with a lumen of a target vessel, the conduit being coupled to at least one of first and second securing components respectively configured to engage interior and exterior surfaces of a wall of the target vessel adjacent an incision therein;

(b) positioning the first securing component through an incision in the target vessel wall and at least partially in the target vessel lumen against the interior surface of the target vessel wall;

(c) positioning the second securing component against the exterior surface of the target vessel wall;

(d) coupling the first and second securing components to secure the conduit to the target vessel wall and create a substantially fluid tight seal between the conduit and the target vessel wall; and

(e) wherein the incision is the only penetration formed in the target vessel wall.

51. The method of claim 50, wherein step (d) is performed by a coupling mechanism that substantially fixes the relative position of the first and second securing components so as to exert a compressive force on the target vessel wall.

52. The method of claim 51, wherein the target vessel is a coronary artery that is at least partially obstructed, and further comprising placing the conduit in fluid communication with a heart chamber containing oxygenated blood to deliver blood into the coronary artery at a site distal to the obstruction.

53. The method of claim 52, wherein the conduit is positioned so as to extend adjacent an external surface of the heart in a substantially flat profile with respect to the myocardium.

54. The method of claim 50, further comprising placing the conduit in fluid communication with a source of blood selected from the group consisting of an aorta, pulmonary artery, pulmonary vein, coronary artery, coronary vein, peripheral artery, and peripheral vein.

55. The method of claim 50, wherein the target vessel is a coronary artery that is at least partially obstructed, and the first and second securing components are secured to the coronary artery in an end-to-side fashion at a site distal to the obstruction.

56. A method for using a conduit to place a target vessel of a patient's vascular system in fluid communication with a source of blood, the method comprising steps of:

(a) providing a conduit having one portion adapted to be placed in fluid communication with a source of blood and another portion adapted to be secured to a target vessel; wherein the conduit is configured to assume a first orientation when in a unbiased state;

(b) biasing the conduit to a second orientation that is different from the first orientation;

(c) securing the conduit to the target vessel; and

(d) allowing the conduit to assume the first orientation with respect to the target vessel.

57. The method of claim 56, wherein step (c) is performed by biasing the conduit to a position that is generally perpendicular to a longitudinal axis of the target vessel, and step (e) is performed by allowing the conduit to move to a low profile position with respect to the target vessel during use.

58. The method of claim 57, wherein when in the low profile position the conduit is generally coplanar with the longitudinal axis of the target vessel.

59. The method of claim 56, wherein the source of blood is a heart chamber containing oxygenated blood and the target vessel is a coronary vessel.

60. The method of claim 56, wherein the other conduit portion includes first and second securing components respectively engaging interior and exterior surfaces of a wall of the target vessel in a tissue-compressing position.

61. The method of claim 58, wherein the first and second securing components are held in the tissue-compressing position by an adjustable coupling, and the

only penetration in the target vessel wall is an incision formed for inserting the first securing component into the lumen of the target vessel.

62. The method of claim 60, wherein the first and second securing components are held in the tissue-compressing position by a mechanism selected from the group consisting of springs, ratchets, screw threads, magnets, sutures, strings, clamps, clips, snaps, resilient bands and O-rings.

63. The method of claim 56, wherein the first and second securing components engage the target vessel wall to form an end-to-side connection between the conduit and the target vessel.

64. A method for securing a conduit to a target vessel of a patient's vascular system, the method comprising steps of:

(a) providing a conduit coupled to at least one of first and second securing components respectively configured to engage interior and exterior surfaces of a target vessel wall adjacent an incision in the target vessel wall;

(b) engaging a working end of a delivery device with at least a portion of the first securing component to support and manipulate the securing component;

(c) positioning at least a part of the first securing component in a lumen of the target vessel against the interior surface of the target vessel wall;

(d) positioning the second securing component against the exterior surface of the target vessel wall to secure the conduit to the target vessel; and

(e) disengaging the working end of the delivery device from the first securing component.

65. The method of claim 64, wherein step (d) comprises at least partially compressing the target vessel wall between the first and second securing components to secure the conduit to the target vessel, without penetrating the target vessel wall.

66. The method of claim 64, wherein the delivery device is engaged and disengaged with the first securing component by expanding and collapsing the working end of the delivery device, respectively.

67. The method of claim 64, wherein the conduit is coupled to the second securing component, and the delivery device has a shaft disposed in the conduit to engage the working end of the delivery device with the first securing component.

68. The method of claim 64, further comprising placing the conduit in fluid communication with a heart chamber containing blood, and wherein the target vessel is a coronary vessel.

69. The method of claim 64, wherein the conduit comprises an autologous vessel coupled to one of the first and second securing components.